Effect of rebar cleanliness and repair materials on reinforcement corrosion and flexural strength of repaired concrete beams

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Abstract: This paper presents result of a study conducted to evaluate the effect of two rebar cleaning procedures and repair materials on reinforcement corrosion and flexural strength of repaired concrete beams. The steel bars in the reinforced concrete beams were corroded to varying degrees to simulate field situations and then repaired utilizing two different cleaning techniques and two repair materials. The repaired beams were then tested in flexure to evaluate the effect of cleaning method and repair materials on the corrosion-resistance and flexural capacity of repaired beams. The electrochemical behavior of cleaned and corroded steel bars was evaluated by conducting a DC potentiodynamic scan. The data indicated an insignificant change in the flexural strength of repaired beams regardless of the cleaning techniques or the repair materials. The accelerated corrosion data indicated lowest corrosion rate in the concrete specimens repaired with polymer-modified cement mortar after cleaning the bars by sand blasting (SB). The DC polarization data indicated the formation of a stable passive film on the steel bars cleaned by SB compared to uncleaned bars and those cleaned by wire brush.